UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

Cambridge.—Mr. A. Harker, fellow of St. John's College, who held the office of University lecturer in petrology, has been appointed reader in petrology.

Mr. C. R. A. Thacker, fellow of Sidney Sussex College, has been appointed junior demonstrator of physiology until September 30, 1919.

Grants have been made from the Balfour fund of 150*l.* to Mr. C. F. Cooper, of Trinity College, 100*l.* to Mr. J. F. Saunders, of Christ's College, and 100*l.* to Mr. J. Gray, fellow of King's College, in aid of zoological investigations.

The Senate has approved the proposal to establish a Geographical Tripos, and the examination for part i. of this Tripos will be first held in 1920, and for part ii. in 1921. It is recognised that the subject of geography is so extensive and borders upon so many other sciences that to fit a student for geographical research or higher teaching a training is necessary which is of the standard of that required for a Tripos. It is also suggested that such a training would be valuable for the future statesman, administrator, merchant, or missionary. The two parts of this Tripos together will qualify for an honours degree, and part i. will qualify for the diploma in geography, which has proved so useful that it is regarded as important that it should be retained.

London.—Dr. Reginald R. Gates has been appointed for three years, as from January 1, 1919, to the newly established University readership in botany tenable at King's College. Dr. Gates has been demonstrator in botany at McGill University, senior fellow and assistant in botany at the University of Chicago, lecturer in biology at St. Thomas's Hospital Medical School, and acting associate professor of zoology in the University of California. He is the author of "The Mutation Factor in Evolution" and numerous articles in English, German, Canadian, and American scientific journals on various aspects of botanical research.

It has been resolved by the Senate that for the duration of the war, and for a period of twelve months from its termination, the Army education certificate shall be accepted as exempting candidates from the matriculation examination.

The degree of D.Sc. in chemistry has been conferred by the Senate on Dr. A. M. Kellas, an external student, for a thesis entitled "The Determination of the Molecular Complexity of Liquid Sulphur."

Scholarships of the value of 50*l.* per annum, and tenable for two years, are being offered by the Institute of Marine Engineers to young engineers desirous of gaining additional technical knowledge.

A travelling scholarship of the value of 150*l.* a year, for past or present students of Somerville College, Oxford, is offered by the Mary Ewart Trust. Applications must be received by Mrs. T. H. Green, 56 Woodstock Road, Oxford, by, at latest, March 15.

A conference on "Industry and Educational Reconstruction" will be held under the auspices of the Industrial Reconstruction Council on Tuesday, February 11, at 6 p.m., in the hall of the Institute of Journalists, 2 and 4 Tudor Street, E.C.4. The opening address will be given by Mr. F. W. Sanderson, headmaster of Oundle School. No tickets are necessary.

A resident fellowship is offered by Somerville College, Oxford, for research in classics, mathematics, philosophy, history, economics, or natural science. Its annual value is 120*l.*, and the normal tenure is five years—renewable. Particulars are obtainable from Miss Darbishire, Somerville College, Oxford. The latest date for receiving applications and evidence of fitness is March 15.

Two lectures arranged by the London County Council Education Officer will be given next week. One on "Agriculture and Rural Life" will be delivered by Mr. Christopher Turnor at King's College, Strand, W.C.2, on Friday, February 14, at 5.30 p.m., and the other on "Pure Science in Relation to the National Life," by Dr. Arthur Schuster, will be given at the Regent Street Polytechnic, W.1, on Saturday, February 15, at 11 a.m.

It will be recalled that the Engineering Training Organisation was founded at a meeting held at the Institution of Civil Engineers on October 25, 1917, when a resolution was adopted to appoint a committee, representative of all the chief engineering and educational bodies, to consider the improvement and better co-ordination of engineering training. The committee thus formed has since been making a general survey of the ground to be covered and establishing the broad principles of future work. It has so far been dependent on voluntary assistance, in which the honorary organisers, Mr. A. E. Berriman, of the Daimler Works, Coventry, and Mr. A. P. M. Fleming, of the British Westinghouse Electric and Manufacturing Co., Ltd., have taken a leading part. A stage has now been reached when a paid secretary has become necessary for the future work of the Organisation, and in our advertisement columns in this issue an announcement is made of the offer of this appointment at a salary of 1000*l.* a year. For this important post a fully trained engineer with adequate educational experience seems essential, and we are glad to observe that the Organisation is offering a salary commensurate with the duties of the position. In doing so the Organisation relies on the generous support of leading firms in the engineering industry. There can be no doubt as to the vital importance to the future of the industry of well-organised and efficient engineering training, and we hope that the appeal will meet with an adequate response.

A petition is being presented to the governors of the Imperial College of Science and Technology by past and present students of the college urging that immediate steps should be taken to raise the status of the college to that of a university of technology, distinct from the University of London, and empowered to confer its own degrees in science and technology, as is done by the Technical Universities of Germany. At a meeting of past and present students held on January 29 at the Imperial College Union, it was decided, with one dissentient only, to sign and present such a petition. The recognition of the Imperial College as an institution of university rank should, says the petition, be one of the earliest items in the programme of legislative reconstruction. The creation of an Imperial University of Technology appears to be justified, the memorial continues, if it can assist in meeting the ever-increasing demand of industry for men efficiently trained in scientific and technological work. The apathy evinced by many firms in London and elsewhere towards technological research is, the petitioners urge, largely attributable to the absence of an institution devoted to technology bearing the authority and dignity of an imperial university; and they go on to plead that students who have passed through the prescribed courses should be able to start their careers with university degrees equivalent to those granted elsewhere. There will be widespread sympathy with the desire expressed in the petition for the further development in London of research in

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technology, and for greater facilities for students desiring to pursue courses of work in applied science; but there are likely to be differences of opinion as to the wisdom of inaugurating a separate university devoted only to study and research in pure and applied science. At Manchester, Glasgow, Edinburgh, Sheffield, Bristol, and other places the colleges of technology have in recent years become technical faculties of the universities of their respective areas; and it would seem that similar co-ordination might be possible in a reconstituted University of London with the Imperial College and other London colleges which provide special facilities in applied science, forming a faculty of technology. Also, it may be doubted whether the associateship of the Royal School of Mines—a constituent college of the Imperial College—could be given a higher value than it has at present by being merged in a mining degree of the proposed new university. No doubt these matters have been considered by the promoters of the movement, and will be carefully weighed by the governors of the Imperial College before taking the steps suggested.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 23.—Sir J. J. Thomson, president, in the chair.—Admiral Sir Henry **Jackson** and Prof. G. B. **Bryan**: Experiments demonstrating an electrical effect in vibrating metals. Experiments are described which demonstrate the electrical effect produced by vibration in wires and other metallic bodies, and a method of detecting and recording them by means of searching coils connected to delicate recording apparatus. The diminution of the effect when the surface of a steel wire is rusted is dealt with, in continuation of a paper by one of the authors on the subject of vibrating wires. The inductive effect of a vibrating wire on a neighbouring circuit is mentioned; and this led up to the fact that all metallic bodies experimented with, whatever their shape or material, generate eddy currents, which can be detected in them by using suitable searching coils. That this effect is primarily due to the vibrating conductor cutting the lines of the earth's magnetic field is proved by the experiments, but that there seems to be a residual effect, not at present fully accounted for, which is greater than can be attributed to experimental errors. Details of the tests are described. These have been carried out with wire bridges, tubes, utensils of various forms and materials, and also with Chladni plates.—Prof. T. H. **Havelock**: Wave resistance: some cases of three-dimensional fluid motion. It is shown how to calculate the wave resistance when the surface pressure is two-dimensional and the wave-pattern like that of ship-waves. Certain cases are examined in detail, and the method can be extended to more complex systems. Interpreting some of the results in terms of the related problem of a submerged body, expressions are obtained for the wave resistance of a prolate spheroid and of other bodies.—W. S. **Abell**: Chances of loss of merchant ships. This communication discusses the effect of damage to vessels in respect of chances of loss of bulkheads and the consequent chances of loss of vessels. If the extent of damage be fairly constant, as in torpedo explosions, it would appear that there is an inferior limit to the spacing of bulkheads. Further, as the carriage of cargo is impeded by subdivision, there is an economic reason for calculating the number of bulkheads sufficient for reasonable safety. Such calculation involves the discussion of chances of loss of one or more bulkheads, and of the relation of size of vessel to bulkhead spacing. Assuming that water-tightness is destroyed within radius R from centre of damage, it is shown that where (1) bulkhead spacing $=2R+a$, the "odds on" for loss of *one* bulkhead are $2R/a$; (2) spacing $=2R-a$, "odds on" for loss of *two* bulkheads are $a/(2R-2a)$; and (3) spacing $=R-a$, "odds on" for loss of *three* bulkheads are $2a/(R-3a)$. These results are applied to the case of ordinary cargo-carrying vessels of fixed type, but of varying lengths, with $R=20$ ft. representing longitudinal extent of torpedo damage. Diagrams accompanying indicate that (1) for a given standard of subdivision, decrease of size of large vessels only slightly increases chances of loss; (2) for small vessels, risk of loss is relatively high, and it is doubtful whether any subdivision whatever is effective for vessels below 320-ft. length; (3) safety increases markedly with length of vessel; and (4) intermediate bulkheads are more useful in larger vessels, but may also, in certain cases, increase risk of loss. By suitable assumptions the method may be used to discuss subdivision of passenger vessels exposed to ordinary marine risks.—Prof. W. M. **Hicks**: A critical study of spectral series. Part v.: The spectra of the monatomic gases. This part deals with the series relationships in the second or blue spectra of the rare gases. Not only are the S, D, and F series allotted, but the discussion serves to amplify and sustain the laws developed in preceding parts, and illustrates their value for the purpose of the analysis of spectra in general. Amongst new methods may be mentioned the use of the links, discovered in part iv. of these communications, for the purpose of dealing with lines expected from formulæ or other considerations which lie outside the observed region. Thus, in the case of a wave-number n of a line in the ultra-violet $n-e$, or $n-u$, or *vice versa* if in the ultra-red $n+e$, $n+u$, where e, u are definite and calculable quantities, may be wave-numbers in the observed region and correspond with lines actually seen. In this way it is possible to obtain evidence of the existence and wave-length of lines belonging to the spectrum, although not actually measured. Of importance also in the general theory of spectra is the discovery of summation series. Thus in the case of the ordinary well-known series the wave-numbers are represented as the difference of two quantities $A-\phi(m)$, where m is the order in the series. It is shown that in the case of the F series at least there are, in addition to these difference frequencies, also a corresponding series of summation frequencies given by $n=A+\phi(m)$. For S, D series, such series if existing, would occur far down in the ultra-violet.

PARIS.

Academy of Sciences, January 20.—M. Léon Guignard in the chair.—H. **Deslandres**: The reform of the calendar. A discussion of a recent proposal of M. Bigourdan, with a summary of previous proposals with the same object. A sketch of an alternative calendar is given.—J. **Andrade**: The minimum number of associated spirals.—R. **Garnier**: The irregular singularities of linear differential equations.—M. **Riquier**: The analytical prolongation of the integrals of certain systems of linear partial differential equations.—G. **Julia**: Some problems relating to the iteration of rational fractions.—P. **Lévy**: Functions of implicit lines.—A. **Guldberg**: The errors of situation of a point.—M. **Mesnager**: A case of simplification of the formulæ of M. Boussinesq.—E. **Belot**: A hypothesis bringing into agreement the vortex cosmogony and the explanation of the peculiarities of novæ and the sun.—G. **Déjardin**: Calculation of the ratio of the principal specific heats of benzene and of cyclohexane by the cyclic method of M. Leduc.—E. **Esclangon**: A new determination of the velocity of sound in the open

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